



North Central Research Station *News*.....

January/February/March 2001

New Developments in Fire Research

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Darkness lay over much of the West last summer—darkness and throat-clenching, eye-watering smoke from the severe forest fires that torched much of the region. The fires of 2000 blackened the western countryside, threatened people and animals, and led to a national plan for learning how best to respond to such wildfires, reduce their impacts on rural communities, and

to hire research meteorologists, geospatial analysts, quantitative ecologists, and other experts.

“Forest Service Research and Development had lost ground in many areas in terms of having the capacity to tackle tough fire problems,” said Assistant Director Dave Shriner, NC’s person on the Eastern Fire Leadership



Don Haines

Expanded funding for fire research will help North Central develop knowledge and tools for communities facing increased risk of wildfire.



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ensure sufficient firefighting resources in the future. As a result of the National Fire Plan, North Central and other Forest Service Research Stations are expanding their role in fire research with an influx of more than \$26 million in research funds and the resulting ability

Team. But the funds from the National Fire Plan will help Forest Service R&D rebuild that capacity to produce new knowledge and tools that will contribute to solving fire-related problems.

*Fire Research
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Last fall, Deputy Chief Robert Lewis asked the Stations to submit proposals for the special funds. More than 260 research proposals were received and reviewed by a selection committee; more than 60 of these were funded on their scientific merit. Seven of the 60 funded proposals came from North Central for a total of \$2,806,000.

"I'm very pleased that we succeeded with so many," said Shriner. "We had to develop and submit the proposals in a very short time, but fortunately, NC researchers are used to working together in interdisciplinary teams because of our integrated research programs and they were able to focus very quickly on the important issues. In addition, our experience in

working with varied people and agencies on the storm recovery plan for the Boundary Waters Canoe Area blowdown has kept us poised to respond rapidly to such opportunities."

"The funding of our proposals also affirms North Central's national leadership role in social science research and in meteorology research," Shriner said.

Nationwide, the proposals focus on building research capacity in four areas: enhancing firefighting capacity and preparedness, restoring landscapes and rebuilding communities, reducing hazardous fuels and fire risk, and working with communities. Stationwide, the proposals focus on a blend of these topics and involve a varied mixture of people, disciplines, and locations. The table below describes them.



North Central's Fire Plan Studies

Study	Team Leader	Plan
Assessing the Risk of Wildfire, and the Vulnerability of Human Populations and Development in the North Central Region	Dave Cleland (Rhinelander), Bob Haight (St. Paul), and Warren Heilman (East Lansing)	Researchers will couple ecological and social factors into a fire risk and consequence model, with an emphasis on reducing the potential for loss of life and property. This line of research will provide managers with a scientifically based decision support tool for prioritizing fire risk reduction activities in regional, landscape, and local contexts.
Strategic Monitoring of Fuel Loadings and Fire Potentials Through the Forest Inventory and Analysis (FIA) Program	Dennis May (St. Paul)	To judge the effectiveness of new fire and fuels management policies and practices, researchers will establish a baseline of current fuel conditions in U.S. forests and then monitor changes in that baseline over time. The new monitoring system will allow researchers to answer critical fire questions such as whether fuel abatement practices are having a significant impact.
National and Regional Fire-Weather Dynamics: Improved Methods for High Resolution Forecasting of Fire-Weather Indices and Smoke Transport	Warren Heilman (East Lansing)	Better predictive models and decision support tools are critical needs of the fire management community. To help meet those needs, scientists will focus on developing effective atmospheric mesoscale model predictions of fire-weather and fire-weather indices at the national and regional levels. Forecast information will be linked with data obtained from FIA's monitoring of fuel loadings to provide improved estimates of daily wildland fire potential.
Modeling People's Responses to Stand- and Landscape-Level Treatments for Preventing Wildfires and Restoring Fire-Affected Areas	John Dwyer (Chicago)	A major obstacle to implementing fire management programs across the landscape is public opposition to many of the treatments used to reduce fuel loads and restore fire-affected areas. This research will evaluate public responses to these treatments and develop guidelines so that land managers can choose communication and treatment strategies more wisely, helping to reduce controversies and strengthen constituencies for fire management treatments.
Managing the Risk of Fire on Human and Ecological Communities in the Wildland-Urban Interface	Eric Gustafson (Rhinelander)	Researchers will investigate how land management and land use changes affect the impact of fire on human and ecological communities across the landscape. The risk maps and vegetation guidelines produced will help land managers understand how the spatial configuration of vegetation management and human community development can be changed to reduce the risk of catastrophic fire.

Studies
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The Surprising Connection Between New Housing and Oak Wilt

Last year's fire season introduced many of us to a new term: rural/urban interface. It's the edge of the subdivision, where lawn meets woodland, and where an aggressive fungal disease called oak wilt gets the upper hand.

Jenny Juzwik, project leader of St. Paul's Forest Diseases unit, and her colleagues began to notice a pattern in the reports of oak wilt since the 1970's—an increasing incidence of tree death around urbanizing areas, where home sites are being carved out of previously forested areas. "At first it was anecdotal," she recalled, "but it was consistent enough to make us want to document what we were seeing."

Oak wilt, caused by a fungus, is one of the most serious tree diseases of the Eastern and Midwestern United States, killing thousands of oaks each year. An infection typically starts at the site of a tree wound, where trunks are nicked and scarred by heavy earthmoving equipment, for instance. Insects attracted by the fresh wounds bring fungal spores to the tree, and an infection begins. From there, the fungus goes underground, spreading from the roots of one infected oak to the joined or grafted roots of adjacent trees.

New to the Neighborhood

As part of North Central's integrated program on Landscape Change, Juzwik's team has begun a project on how urbanization affects oak tree health and the oak resource in the Upper Midwest. The study will be piloted in the Minneapolis-St. Paul area, part of the region where oak wilt is endemic. The team's goals are to collect historical data, use these

data to predict the impact of planned development on the oak resource, and finally, evaluate strategies designed to minimize the impact on oak tree health. Juzwik will be working with a University of Minnesota cooperators, Gary Johnson and Brian Loeffelholz, and with the Minnesota Department of Natural Resources' Jean Mouelle and Susan Burks.

"We want to raise planners', developers', and the public's awareness about oak tree health, and particularly about oak wilt, before



New housing developments in wooded areas can lead to an increase in tree health problems.

they build in oak woods—because what they do before and during development may mean life or death for oak trees," Juzwik explained.

"Because one of the strategies for controlling oak wilt is using trenching and vibratory plowing to break up connected roots, property owners need to know whether there is oak wilt on their property before they develop roads and install underground utilities," Juzwik said. "Once phone and utility wires and pipes are buried, trenching or vibratory plowing are no longer control options."

Don't Wound Trees in the Spring

Another important fact is that most, if not all, insect-spread oak wilt

occurs during the spring. If land is developed then, the chances of oaks contracting oak wilt—especially if they are wounded during road construction or land preparation—increase significantly. The most susceptible time for infection is 1 up to 8 days after the tree is wounded. One strategy for preventing oak wilt, then, is not to wound trees during the spring.

Once an oak is affected with oak wilt, there is no reprieve. Red oaks such as northern red and black oak often die quickly, sometimes within 4 to 6 weeks. The crowns of white oaks such as bur oaks may die back over one to several years before mortality occurs.

Juzwik and her colleagues are hoping the techniques they develop to assess historical activity, and to predict future oak wilt losses, will be transferable to other urbanizing areas in the North Central and Northeastern United States. When it comes to oak wilt, it seems an ounce of prevention is truly worth a pound of cure.

Ken Holman of the Minnesota Department of Natural Resources has high hopes for the research findings: "Our hope is that this research will help communities, landowners, and foresters look at oak wilt in the larger context of oak forest health. Oak wilt control has become more proactive, with cities treating infection centers before roads and homes are built. Perhaps soon we can predict which forests are most vulnerable, and use this even earlier in the land use planning process, BEFORE properties are platted for development."



Contributed by Norene Blair

Jim Mattson, Engineer Extraordinaire, Retires



It's hard to get Jim Mattson to talk about himself, even at the close of a long productive career at the North Central Station. To this modest, gracious man, his time with the Forest Service—at the Houghton

(a mile or so from where he grew up and went to college)—was mainly a story of teamwork.

In his 31 years at the Lab, Jim joined forces with many people to find solutions to problems of harvesting, transporting, and processing forest products. He worked with engineers, model makers, extension foresters, university staff, industry foresters, land managers, and others from the Forest Engineering unit at Houghton, the Midwest, and beyond. Over the years, Jim focused particularly on improving whole-tree chip quality, mechanized thinning, using forest residues for energy, and developing and finding uses for a material called chunkwood.

Some of the high points along the way: being part of the team that received the USDA Superior Service

Award for its research accomplishments in bark removal after chipping; receiving a patent, with mechanical engineer Mike Wehr, for developing the continuous tree harvester; leading a working group within the International Energy Agency to identify multinational research and development efforts needed to implement the use of forest residues for energy; and receiving NC's Multicultural Achievement Award for work with cooperators from historically black colleges and universities and other Equal Employment Opportunity efforts.

Perhaps a farewell "testimonial" of sorts from a Houghton cooperator—Charlie Blinn, professor and extension forester from the Department of Forest Products at the University of Minnesota—wraps Jim and his work up best:

"Over the years, I have had many occasions to work with Jim Mattson and several other people from his work unit at Houghton. Some of the projects involved collaborative research such as evaluating impacts from harvesting within a riparian management zone, summarizing information about the range of options for crossing streams and wetlands, and comparing cable yarding options for diverting water off of forest roads and skid trails. Others involved disseminating information by holding workshops and conferences, by producing publications, or just by answering questions. Throughout his career, Jim helped make a real difference in our ability to better understand harvesting operations, their impacts, and methods to mitigate some of those impacts."



Contributed by Lucy Burde

People on the Move . . .

Moving on...

Matthew Gennrich, East Lansing; **Kenton Samfilippo**, Mt. Pleasant, and **Brian Wall**, Wisconsin Rapids, resigned.

Pam Day, St. Paul; and **Glen Erickson**, Grand Rapids, retired.



Professor Crow Returns to NC with Highest Honors

For NC Research Plant Ecologist Tom Crow, a 2-year teaching sabbatical at the University of Michigan proved to be a real education.

In May of 1998, Crow became the first Theodore Roosevelt Professor at the University of Michigan's School of Natural Resources and Environment. The newly endowed post was designed to foster research, learning, and practice in ecosystem management, a field that Crow himself helped to found. During Crow's sabbatical, 75 percent of his time was funded by the University and 25 percent of his time was spent advising the Station Director and staff on integrated programs, as well as continuing with his research.

A Natural Teacher

In case you're thinking "sabbatical" means "time out" in a researcher's career, think again. Crow's appointment hummed with activity, including teaching two courses, developing a research agenda in ecosystem management (which included graduate students), and building an academic program that features ecosystem management as its overarching theme.

For Crow, the highlight was creating and presenting two courses, *Ecosystem Management, Principles and Applications*, and *Biophysical Principles for Landscape Ecology*, during which he discovered just how much he enjoyed teaching.

"Without question, working with students was the best part of the experience," Crow said. "It was very gratifying to work with so many bright, energetic, and dedicated students who want to be good stewards of our planet."

Crow was also impressed by how much had changed since his college days in the sixties. "The fact that ecosystem management is now being used as an integrating theme speaks volumes about how the field of natural resource management has evolved," Crow remarked. "We're also seeing whole new areas of scholarship such as environmental justice that were simply not part of our training in the 1960's."

Since the beginning of his Forest Service career, Crow has viewed the world through an ecological lens and has used the rigors of scientific inquiry to learn more

about that world. His ecological approach to silviculture systems—a unique perspective not all that long ago—led to some insightful and influential research. Crow's research into oak regeneration, for instance, produced a synthesis of landscape ecology, stand-level ecology, and tree physiology that was a significant improvement over traditional regeneration studies.

Crow has encouraged land managers to consider both spatial and temporal aspects of ecological systems and has effectively argued for the use of Geographical Information Systems (GIS) to improve research and resource management. According to colleagues in the Lakes States National Forests, Crow has a special knack for getting people to listen to new ideas. His clear thinking and diplomacy have made him one of the most effective spokespersons for ecosystem management in the Nation.

Distinguished Science Award

Crow's esteemed reputation in the scientific community also earned him another honor recently: the Forest Service Distinguished Science Award for Superior Science. The award recognized Crow's dual successes—embedding the principles of ecology into forest management, and guiding the landscape ecology unit in Rhinelander, Wisconsin from 1982 to 1998.

This school year, Crow came back to North Central as Research Plant Ecologist with the Northern Silviculture unit in Grand Rapids. He plans to stay involved with the University of Michigan, advising graduate students studying the Riverside community near Chicago (a 1,600-acre community on the Des Plaines River that was designed by Frederick Law Olmstead). Crow has also begun two ecosystem management studies, and is the Principal Investigator on a National Science Foundation Biocomplexity Incubation Grant.



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Crow Returns
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On the heels of a memorable fire year, he's also been asked to spearhead a National fire plan project related to hazardous fuels reduction.

Stepping Back to a New NC

Assistant Director for Research Dave Shriner is enthusiastic about Crow's return. "We're excited to have his ideas and leadership back in the Station," Shriner said, "and are very pleased that he has agreed to be one of our co-leads for the 'Forest Productivity Integrated Program.'" This cross-disciplinary program examines questions such as "How productive are our forests? How productive could they be? And how can we enhance productivity?" Crow's ability to see the landscape perspective and put the pieces together will help us examine not just the ecological, but also the social and economic implications of our changing forests.

Looking back at his sabbatical experience, Crow feels that the new challenges and experiences he had on campus helped him to continue to grow as a scientist.

"It gave me a chance to teach, work with students, and be part of a large academic community," said Crow. "I think this kind of involvement helps make me a better researcher in the Forest Service."

For now, Crow is looking forward to bringing a landscape perspective to the Northern Forest Silvicultural project. "Coming to work is fun," Crow enthused, "and there is much more to be accomplished! This is a good time to be part of the North Central Station."

Welcome back, Tom—we're happy you're a part of us, too!



Contributed by Laura Hutchinson

Studies
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Study	Team Leader	Plan
Community Partnerships: Landscape-level Strategies to Reduce the Risk and Loss from Catastrophic Fires	Pam Jakes (St. Paul)	What strategies can communities adopt to increase the effectiveness of fire management programs for different types of communities and landscapes? In a series of case studies, researchers will examine the successful preparations and actions of communities that have lived through catastrophes.
Optimizing Fuel Reductions in Time and Space Using Spatial Models	Tom Crow (Grand Rapids)	To learn how to reduce fire risk by reducing hazardous fuels, researchers will ask two fundamental questions: (1) when and where should fuel reductions be applied to obtain the greatest reductions in fire risk at lowest cost, and (2) what are the ecological and social consequences of these treatments? The Boundary Waters Canoe Area blowdown created by the Independence Day 1999 windstorm will be used as a case study.

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